REMARKS/ARGUMENTS

Claims 1-14 are currently pending in this application and stand rejected. Claim 1 has been amended to incorporate the subject matter of Claims 2 and 3 and to overcome the Examiner's objections raised under 35 U.S.C. § 112 in §§ 1.1 and 1.2 of the Office Action. Claims 2 and 3 have thus been canceled. Claim 4 has been amended to clarify that the grippers exert a force in a direction to draw at least one of either the base member or the foot member, associated with that gripper, toward the tube sheet to positively bias the corresponding member against the tube sheet. The Examiner indicated that Claim 8 contains allowable subject matter. Claim 8 has been amended to incorporate the subject matter of Claim 1 and place Claim 8 in independent form to further isolate the issues that remain open. Additionally, Claim 10 has been amended to address the Examiner's concern raised in § 1.3 of the Office Action under 35 U.S.C. § 112, though the fact that channel heads may be of different sizes is irrelevant so long as this invention can be applied to one or more channel heads by operating more than one manipulator in the same inlet or outlet section of the channel head at the same time. Thus, it is respectfully believed that the objections raised in Section I under 35 U.S.C. § 112 have been overcome.

In Paragraph 1 of Section II of the Office Action, Claims 1-6, 10-12, and 14 are rejected under 35 U.S.C. § 103(a) as being unpatentable over Adamowski (US 4,298,054A) in view of Yanagisawa (US 5,351,626A). With regard to Claims 1-4, the Examiner asserts that Adamowski discloses "a block member (10) moveable in two perpendicular linear directions in horizontal and vertical directions (fl and vertical), a foot member (at 12a) having a gripper (11a) for drawing the manipulator toward the tube sheet." The Examiner recognized that Adamowski fails to teach the block member rotably connected to the base member and cites Yanagisawa for such teaching. However, Adamowski fails to teach more than the rotatable coupling. The Examiner analogizes a second traverse member 14 of Adamowski to Applicants' base member and Adamowski's first transverse member 10 to Applicants' block member. However, the traverse members 10 and 14 are not directly coupled and are both supported through a frame 9. Each of the traverse members 10 and 14 are respectively moveable in the

directions f1 and f2 in parallel planes and further moveable in the vertical direction within the frame 9. In contrast, Applicants' block member is connected to the base member and to the foot member, and the block member moves in two directions, in a straight line in the horizontal and vertical directions between the foot member and the base member while maintaining the foot member and the base member in parallel planes. The Examiner analogizes Applicants' foot member to the Adamowski component 12a. 12a is the hydraulic actuator for the expansible mandrills 11a that grips the tube. Component 12a that the Examiner analogizes to Applicants' foot member does not move with respect to the Adamowski transverse member 10, which the Examiner analogizes to Applicants' block member. A more proper analogy would be to consider either transverse member 10 or 14 as the foot member, the other transverse member 10 or 14 as the base member and the frame 9 of Adamowski as the block member. However, even then, the block member does not move in two directions of linear travel in a straight line in the horizontal and vertical directions between the foot member and the base member. Accordingly, Adamowski fails in a number of respects to meet the limitations of Applicants' Claim 1.

The Examiner asserts that Yanagisawa teaches a block member (20) rotatable with respect to the base member (20), asserting that it would have been obvious to add the additional degree of freedom of rotation to Adamowski. First of all, the Examiner is identifying the block member and base member by the same reference character 20. If an analogy were to be made, one or the other of the base member and foot member could be analogized to the member 20 of Yanagisawa and the corresponding extension arms 14a and 14b and the other of the base member and foot member can be analogized to the member 22 with its corresponding extension arms 10a and 10b with the block member forming the connection therebetween. However, even in this instance, the block member of Yanagisawa does not move in two directions of linear travel between the foot member and the base member. Furthermore, it is totally unclear how the frame member 9 of Adamowski can be made to rotate relative to the foot member or the base member. Accordingly, Claim 1 should not rightfully be considered obvious over Adamowski in view of Yanagisawa.

Claim 4 calls for the limitation that the grippers exert a force in a direction to draw at least one of either the base member or the foot member, associated with the gripper, towards the tube sheet to positively bias the one of the base member or the foot member against the tube sheet. The expandable mandrills 11a and 11b of Adamowski do not exert any force to draw the Adamowski fixture towards the tube sheet. They are merely inserted into the tubes and expanded to anchor the transverse members to the tube sheet. Accordingly, Claim 4 further distinguishes over the references for the individual limitation that it introduces. Claims 5 and 6 are respectively dependent upon Claims 4 and 1 and distinguish for the reasons previously noted. Claims 10 and 11 call for operating at least two manipulators of the same design in the same section of the channel head at the same time. There is no teaching in either reference to such a teaching. Accordingly, Claims 10 and 11 distinguish for the individual limitations that they introduce. Claims 12-14 are either directly or indirectly dependent upon Claim 1 and distinguish for the foregoing reasons. Accordingly, it is respectfully requested that the rejections set forth in Paragraph 1 of Section II be withdrawn.

In Paragraph 2 of Section II of the Office Action, Claim 7 is rejected under 35 U.S.C. § 103(a) as being unpatentable over Adamowski in view of Yanagisawa, and further in view of Shunichi (US 4,070,561A). Claim 7 calls for the manipulator of Claim 1 wherein each of the grippers include insertion fingers that are respectively insertable into a corresponding one of the tubes extending through the tube sheet, and each of said grippers further include a limit switch that functions to verify a pre-selected length of insertion of the insertion fingers into the tube. First of all, Shunichi fails to cure the deficiencies noted above for both Adamowski and Yanagisawa. In Column 10, Line 4, Shunichi states that:

> The upper and lower limits of movement of the tap arbors 20, 21, and 22, 23 are detected by the limit switches LS1, LS2, LS5, LS6 and LS11, LS12, LS15, LS16. Among the limit switches, switches LS11 and LS12 belonging to the carrier body 18 detect the upper end and lower end of the tab arbors 20, 21, respectively, and switches LS16 sense the safety of the upper-end movement in the arbors 20 and 21, respectively. The detecting operations of the limit switches LS1, LS2 and LS5, LS6 belonging to the carrier body 19 correspond to those of the limit switches LS11, LS12 and LS15, LS16, respectively. Here, when all the limits switches LS1, LS5 and LS6 are closed, the normal operations of the tab arbors 22 and 23 are

> detected. If, however, the limit switches LS5 and LS6 are closed during the open state of the limit switches LS1, it will be detected that the insertion of the tap arbors 22 and 23 into the slender tubes 4 is inferior.

Thus, the limit switches of Shunichi detect whether the arbors are fully extended or fully withdrawn, not the degree of insertion within the tube itself. In contrast, as taught in Applicants' specification starting at the very end of page 9 and continuing on to the top paragraph on page 10, Applicants state:

> A limit switch 69, which is actuated by the guide pin 60, can be used to verify insertion. The guide pin 60 is protected within the housing 72. The limit switch has three functions: (1) to assure that the gripper is in the full up position prior to activation of the gripper fingers 55 to press out against the corresponding heat exchanger tube; (2) to detect if the cam lock does not fully grip the corresponding heat exchanger tube (the limit switch will indicate that the gripper is not fully up when the gripper is pulled down after the gripper fingers are radially extenuated, to fully seat the robot's standoff pins 14 against the tube sheet 65); and (3) to detect if there is a missing tube.

With the grippers exerting a positive bias by forcing the manipulator standoffs against the tube sheet, the limit switches provide the additional function of verifying that a pre-selected length of insertion of the insertion fingers into the corresponding tube has been accomplished. Thus, Claim 7 distinguishes for the individual limitation that it introduces and should similarly be allowable.

In Paragraph 3 of Section II of the Office Action, Claims 12-13 are rejected under 35 U.S.C. § 103(a) as being unpatentable over Adamowski in view of Yanagisawa, and further in view of Ward (US 3,913,452). Claims 12 and 13 are directly or indirectly dependent upon Claim 1 and distinguish for the reasons noted above and therefore should be similarly allowable.

Accordingly, Applicants have shown wherein Applicants' amended Claims 1 and 4-14 distinguish over the references, considered either singly or in combination, and

should not rightfully be considered obvious. Thus, reconsideration, allowance and passage to issue of this Application are respectfully requested.

If any amounts are due for this application, please charge deposit account 02-2556.

Respectfully submitted,

By _____

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